

1 **CLAIMS**

2 What is claimed is:

3 1. In a surgical intramedullary system for compressing
4 fractures having an elongated cannulated shaft with tang exit
5 holes and at least one deployable tang, the improvement comprising
6 an end cap bonded to one end of said shaft by a first bond, said
7 first bond being autologous, a tang body slidably disposed in said
8 one end of said cannulated shaft, the internal wall of said
9 cannulated shaft and the external surface of said tang body
10 congruently shaped to restrict movement of said tang body to the
11 longitudinal axis of said cannulated shaft, said at least one tang
12 with a first end and a second end, said first end bonded to said
13 tang body by a second bond, said second bond being autologous,
14 said second end adapted to transit one tang exit hole in said
15 cannulated shaft upon longitudinal movement of said tang body,
16 said tang body including a link adapted to cooperate with a tool
17 to generate longitudinal movement.

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19 2. In a surgical intramedullary system of claim 1, the
20 improvement comprising said first bond and said second bond formed
21 by laser welding.

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1 3. In a surgical intramedullary system of claim 1, the
2 improvement comprising said tang body being of a first material,
3 said at least one tang being of a second material, said materials
4 being compatible to produce a permanent second bond.

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6 4. In a surgical intramedullary system of claim 3, the
7 improvement comprising said tang body being of titanium having a
8 first stiffness, said at least one tang being of titanium of a
9 second lesser stiffness whereby said tang is adapted to deform
10 during transit through said exit holes.

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12 5. In a surgical intramedullary system of claim 4, the
13 improvement comprising said at least one tang having a rectilinear
14 shape defining planar sides having dimensions, said dimensions
15 affecting said stiffness of said at least one tang.

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17 6. In a surgical intramedullary system of claim 5, the
18 improvement comprising said external surface of said tang body
19 having planar sections, said first end of said at least one tang
20 bonded to a planar section.

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22 7. In a surgical intramedullary system of claim 1, the
23 improvement comprising said cannulated shaft and said end cap
24 formed of titanium.

1 8. In a surgical intramedullary system of claim 7, the
2 improvement comprising said first bond and said second bond formed
3 by laser welding.

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5 9. In a surgical intramedullary system of claim 1, the
6 improvement comprising said link composed of a central aperture
7 through said tang body, said aperture having internal draw bolt
8 threads.

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10 10. In a surgical orthopedic system for repair of bones
11 including an elongated cannulated shaft for placement in the
12 intramedullary canal, said cannulated shaft having radial exit
13 holes, a tang body movably disposed in said cannulated shaft, said
14 tang body having attached elongated tangs adapted to transit said
15 exit holes, and an end cap, the improvement comprising permanently
16 bonding said end cap to one end of said cannulated shaft by laser
17 welding, a plurality of elongated tangs uniformly disposed about
18 the surface of said tang body, each of said plurality of elongated
19 tangs permanently attached at one end to said tang body by laser
20 welding, each of said plurality of tangs having a rectilinear
21 cross section for precise control of bending moment, said tang
22 body having a central aperture with internal threads adapted to
23 engage a draw bolt whereby said plurality of tangs transit said
24 exit holes as said tang body slides through said cannulated shaft.

1 11. In a surgical orthopedic system for repair of bones of
2 claim 9, the improvement comprising said cannulated shaft, said
3 end cap and said plurality of tangs constructed from titanium,
4 said tangs having a degree of stiffness less than the degree of
5 stiffness of said tang body whereby the transit force is adjusted.

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7 12. In a surgical orthopedic system for repair of bones of
8 claim 10, the improvement comprising said cannulated shaft having
9 a plurality of intersecting planar internal walls, said tang body
10 having a plurality of intersecting planar exterior surfaces said
11 planar internal walls and said planar exterior surfaces combining
12 to restrict sliding of said tang body to a longitudinal direction.

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14 13. In a surgical orthopedic system for repair of bones of
15 claim 12, the improvement comprising each of said plurality of
16 tangs each are welded to a planar exterior surface of said tang
17 body and said plurality of tangs numbers 4.

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19 14. A surgical system comprising a intramedullary screw with
20 an elongated cannulated shaft having a leading end and a trailing
21 end, said cannulated shaft having shaped internal walls near said
22 leading end and a plurality of tang exit holes in said shaft, a
23 tang body slidably disposed near said leading end of said shaft,
24 said tang body having an external shape congruent with said

1 internal walls of said cannulated shaft, said tang body having a
2 plurality of tangs bonded to said tang body about said external
3 shape, said external shape of said tang body and said shaped
4 internal walls of said shaft registering said tangs and said tang
5 exit holes, an end cap on said one end of said shaft having an
6 aperture, said intramedullary screw made by the steps of:
7 (a) fabricating a tubular screw having an internal bore, said bore
8 having a larger diameter near said leading end, forming
9 intersecting planar surfaces on the sides of said larger diameter
10 internal bore and radial exit holes therefrom;
11 (b) forming an end cap of a size to close said bore at said
12 leading end;
13 (c) forming a tang body having an external surface with
14 intersecting planar surfaces, said surfaces congruent with said
15 planar surfaces on said internal sides of said bore, forming
16 grooves in said intersecting planar surfaces and forming a central
17 aperture internally screw threaded;
18 (d) forming a plurality of elongated rectangular tangs having a
19 length, width and height, chamfering one end of each of said
20 plurality of tangs;
21 (e) placing one of said plurality of tangs in each of said grooves
22 in said tang body and laser welding said tang and said tang body
23 together; and
24 (f) assembling said tubular screw and said tang body by sliding

1 said tang body in said leading end of said screw with said tangs
2 disposed adjacent said exit holes; and
3 (g) bonding said end cap to said one end by laser welding.

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5 15. A surgical system of claim 14 including the steps of:
6 (a) forming a shoulder in said bore adjacent said exit holes; and
7 (b) sliding said tang body in said leading end to place said
8 chamfered ends of said tangs adjacent said shoulder.

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10 16. A surgical system of claim 14 including the steps of:
11 (a) inserting a tool through said bore from said tailing end to
12 said leading end, said tool having draw threads on the forward
13 end;
14 (b) turning said tool to engage said threads in said tang body and
15 said draw threads on said tool; and
16 (c) said turning of said tool translating said tangs through said
17 tang exit holes when said tool contacts said end cap.

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